REMARKS

Upon receipt of this response, the Examiner is respectfully requested to contact the undersigned representative of the Applicant to arrange a telephone interview concerning the inventive merits of this application.

It must be noted that the present Response addresses both the issues raised in the Official Action of August 10, 2006 and certain issues raised by the Examiner in telephone conversions between the Examiner and Michael J. Bujold, Jay S. Franklin and Gary D. Clapp, all representatives of the Applicant for purposes of prosecution of the present Application, during the period of approximately November 1, 2006 and November 6, 2006 as a consequence of a draft copy of the Response submitted to the Examiner by Michael Bujold. The following will therefore first address the issues raised in the Official Action of August 10, 2006 and will then address the additional issues raised verbally by the Examiner during conversions with the above noted representatives of the Applicant.

Claims 16-18, 20-23 and 26 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter not disclosed in the specification. In particular, the Examiner rejects claims 16-18, 20-23 and 26 on the grounds that the specification does not contain full disclosure of the recited "lightweight rigid core of honeycomb cellular material". In this regard, the Examiner further states that the lightweight rigid core of honeycomb material described in paragraph 3 of the specification is instead directed to a conventional paper honeycomb rather than a honeycomb material of the present invention.

Upon consideration of the Examiner's rejection, claims 16, 21, and 26 are amended to eliminate the term "lightweight", although the Applicant would like to point out that Webster's *Ninth New Collegiate Dictionary* defines honeycomb as "a strong lightweight cellular structural material", which is the commonly understood meaning of what is meant by a honeycomb

material. However, the term "rigid core" is retained in the claims since this terminology is believed to be fully supported by the specification as originally filed.

The Examiner rejects claims 16-18, 20-23 and 26 under 35 U.S.C. § 112, first paragraph, on the grounds that the specification describes only a conventional honeycomb material, such as that formed of folded paper ribbons as described, for example, in Turner et al. `668. In response, the Applicant wishes to draw the Examiner's attention to the honeycomb material of the present invention as illustrated in, for example, FIGS. 1-6 and paragraphs 024 and 025 of the pending specification, which clearly show that the honeycomb material of the present invention is formed of a plurality of individually extruded tubes arranged adjacently and in parallel and in a hexagonal pattern to form a honeycomb where each tube has a first end in contact with a first side skin and a second end in contact with a second side skin. Accordingly, claims 16, 21 and 26 are amended to explicitly recite that the honeycomb material of the present invention is formed of:

> a plurality of individually extruded tubes arranged adjacently and in parallel and in a hexagonal pattern to form a honeycomb wherein each tube has a first end in contact with a first side skin and a second end in contact with a second side skin . . .

or equivalent terms.

It is, therefore, the Applicant's position that independent claims 16, 21 and 26, and thereby dependent claims 17-18, 20, 22, and 23, are fully supported by and compliant with the specification as originally filed, and that the above described claim amendments do not add any new matter. The Applicant, therefore, respectfully requests that the Examiner reconsider and withdraw all rejections of claims 16-18, 20-23 and 26, under 35 U.S.C. § 112, first paragraph.

Further in this regard, if the Examiner would prefer to see the above discussed descriptions of the honeycomb material of the present invention as shown in the Figures also explicitly stated in the text of the specification, the Applicant is willingly amend the text of the

specification, if requested by the Examiner, to state what is clearly disclosed by the originally filed figures.

Next, the Examiner rejects claims 16-18, 20-23, and 26 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to adequately delineate and limit the materials of the core, the skins and the adhesive. The Examiner states that the claims recite only the desired physical characteristics of the materials and that this limitation is insufficient to adequately limit and thus define those materials that could fall within the bounds of the claims.

In response, independent claims 16, 21 and 26 are amended to explicitly recite that the core comprises tubes formed of a polyetherimid material thermoformable in a temperature range up to 170°C, that the skins are formed of a reinforced thermoplastic laminate thermoformable in a temperature range of 150°C to 300°C; and the adhesive is a polyester base thermoplastic adhesive having a fusion temperature less than 150°C, all of which are fully supported by the specification as originally filed.

It is, therefore, the Applicant's position that the claims, as amended, now adequately define and limit the materials to be employed as the core tubes, the skins and the adhesive by reciting the specific family or families of materials that comprise the core tubes, the skins and the adhesive. In this regard, it must be noted that the claims further recite physical characteristics of these materials, that is, the thermoformable or fusion temperature ranges of the materials, further delineating and limiting the materials that fall within the bounds of the claims. It must also be noted that these amendments to the claims are fully supported by and compliant with the specification as originally filed, and that the above described claim amendments do not add any new matter. The Applicant, therefore, respectfully requests that the Examiner reconsider and withdraw all rejections of claims 16-18, 20-23, and 26 under 35 U.S.C. § 112, second paragraph.

Next, the Examiner rejects claims 16-18, 20-23 and 26, under 35 U.S.C. § 102 or alternatively under 35 U.S.C. § 103, as being unpatentable over Kaufmann `500 alone or Kaufmann `500 in view of Turner `668 and the article "Thermoplastic Polymer Products"and the reference of Heitkamp 4,956,217 recently brought to our attention by the Examiner. The Applicant acknowledges and respectfully traverses the raised anticipatory and obviousness rejections in view of the following remarks.

First considering the present invention as recited in independent claim 16, and as correspondingly recited in independent claims 21 and 26, the present invention is directed to a composite sheet material comprising a rigid core of honeycomb cellular material, a first skin and a second skin. The honeycomb cellular material has a first side and a second side and an initial thickness and is formed of a plurality of individually extruded tubes arranged adjacently and in parallel and in a hexagonal pattern to form a honeycomb internal structure in which each tube has a first end in contact with the first side skin and a second end in contact with the second side skin. The first skin is formed of continuous sheet material on the first side of the core and the second skin is formed of continuous sheet material on the second side of the core and the first and the second skins each have an initial thickness.

As recited in the presently pending claims, the tubes are formed of polyetherimid material thermoformable in a temperature range up to 170°C, the first and the second skins are formed of a reinforced thermoplastic laminate thermoformable in a temperature range of 150°C to 300°C; and the first and second skins are bonded to the rigid core by a polyester base thermoplastic adhesive having a fusion temperature less than150°C

A composite panel formed of the rigid core and the first and the second skins is uniformly compressed while heated to a temperature in a thermoformable range of 150°C to 170°C so as to have a thickness less than a sum of the initial thicknesses of the rigid core and the first and second side skins. As a result of this compression process, the first and the

second ends of each of the tubes is distorted to bridge interstices between the first ends and the second ends of each of the tubes to thereby increase the contact surface area between the tubes and the first side skin and the second side skin.

Now considering the cited prior art comprising either Kaufmann `500 alone or in combination with Turner `668 and the article "Thermoplastic Polymer Products", the following will first consider the cited references individually and will then consider whether the references can be so combined under the requirements and provisions of 35 U.S.C. § 103 and the possible teachings resulting from such a combination.

Kaufmann `500 relates to a method of forming structural panels having a core either of foam or a honeycomb structure made of folded aramid paper ribbons and having facings of thermoplastic resin bonded thereto.

First considering the geometric structures and construction of the Kaufmann `500 core as compared to the core of the present invention, the Kaufmann `500, as clearly shown, for example, in FIGS. 8 and 9, comprises contiguous straight walled hexagonal cells formed from strips of paper ribbon. Although Kaufmann `500 does not describe the construction of the hexagonal cell honeycomb core in detail, such cores are typically constructed by shaping continuous paper strips into straight segments corresponding the straight walls of the hexagonal cells where the straight segments are joined by suitably angled folds corresponding to the corners of the hexagonal shapes and where the mating straight wall segments of adjoining hexagons are usually glued to one another to hold the ribbons in the desired hexagonal shapes.

In fundamental contrast from the teachings of Kaufmann `500, the honeycomb core of the present invention, as recited in independent claims 16, 21 and 26, are formed of individually extruded tubes arranged adjacently and in parallel and in a hexagonal pattern to form a honeycomb structure in which each tube has a first end in contact with the first side skin and a second end in contact with the second side skin. It is, therefore, apparent that the structure

of the core of the present invention is of a fundamentally different design and construction than the core taught by Kaufmann `500 which is formed of hexagonally packed tubular cells rather than straight walled hexagonal cells.

It will be appreciated by those of ordinary skill in the arts that this fundamental difference between the core as taught by Kaufmann `500 and the core of the present invention results in other fundamental distinctions and differences between the present invention and Kaufmann `500. For example, it is well known and understood by those of ordinary skill in the arts that tubular structural shapes, such as those forming the cells of the core of the present invention are typically and inherently much stronger than structural shapes formed of straight segments, so that the core of the present invention would reasonably be expected to be inherently stronger, pound for pound, than the core taught by Kaufmann `500.

In addition, the construction of the core of the present invention, which is adjacent hexagonally packed tubular shapes, will result in the presence of interstices between the tubular cells, that is, spaces of a generally triangular shape with curved walls, which are of particular significance where the ends of the tubes, that is, the two opposite sides of the core, come into contact with the skins. That is, when a panel comprise the core and the two skins is heated and compressed, the material forming the ends of the tubes will spread to bridge the interstices between adjacent tubes to thereby provide significantly greater contact area between the tubes and the skins.

According to Kaufmann `500, and in complete contrast from the present invention, the bonding strength between the resin facings and the straight walled hexagonal cells can be increase by "crushing" the core. During this process, the resin facings are pressed or forced onto the core with sufficient force to fold or bend over the end walls of the hexagonal cells into hook shapes, which will result in a portion of the sides of the hexagonal cell walls adjacent to

the resin facings being forced into contact with the resin facings, thereby increasing the bonding surface area between the walls of the hexagonal cells and the resin facings.

It is, therefore, apparent that the process taught by Kaufmann `500, that is, crushing the hexagonal cells to fold or bend the walls over into contact with the facings, is a fundamentally different process than that recited in the present claims, wherein the ends of the tubes are compressed to spread, without crushing, folding or bending of the walls of the tubes, to increase the contact area between the ends of the tubes and the skins.

It should also be noted that the fundamental differences between the process taught by Kaufmann `500 and the process taught by the present invention for increasing the contact area between the core and the skins or facings reflect other basic differences between Kaufmann `500 and the present invention. For example, it is respectfully submitted that not only are the tubular cells walls of the present invention inherently stronger than the straight cells walls taught by Kaufmann `500, but the folding or bending of straight cell walls, as with Kaufmann `500, will structurally weaken the cell walls as compared to the compressive spreading of the ends of the tubular walls as taught in the present invention.

It should also be noted in this regard that tubular cell walls, according the present invention, are inherently much more resistant to bending or folding than are the flat cell walls taught by Kaufmann `500, so that the Kaufmann `500 method of folding sections of the flat cell walls would not be feasible with the tubular cell walls of the present invention.

It is therefore the Applicant's position that claims 16, 21 and 26, and thereby all of the claims which depend therefrom, are fully and patentably distinguished over and from the teachings of Kaufmann `500, under either or both of 35 U.S.C. § 102 and/or 35 U.S.C. § 103, for the above reasons. The Applicant, therefore, respectfully requests that the Examiner reconsider and withdraw all rejections of claims 16, 21 and 26, as well as all claims which

depend therefrom, over Kaufmann `500, and allow claims 16, 21 and 26 and the dependent claims as amended herein above.

Continuing consideration of the fundamental distinctions between Kaufmann `500 and the present invention, it must be noted that in the present invention as recited in claim 21, the first and second skins are attached to the core by separate layers of adhesive, which are recited in claim 21 as a polyester base thermoplastic adhesive having a fusion temperature less than 150°C. As described in the specification, the adhesive layers not only bond the skins to the core, but also allows relative movement between the skins and the core when heated appropriately, for example, when shaping the composite panel into a curved shape.

According to Kaufmann `500, and in fundamental contrast from the panel of the present invention, the facings are not bonded to the core by separate layers of adhesive but instead are bond directly to the core. As a consequence, the resin facings must be both a core covering and the bonding agent between themselves and the core. In this regard, it must be noted that Kaufmann `500 describes only the initial construction of the panels where the resin facings are initially bonded to the core, and does not described even the possibility of a subsequent heating of the resin facings to allow reshaping or curving of the panels by movement between the core and the resin facings. The clear conclusion is that such subsequent reheating and reshaping by movement of the core with respect to one or more of the facings is, in complete contrast from the present invention as recited in claim 21, not possible in the Kaufmann `500 panel because the resin facings are required to bond directly to the core, thereby limiting the possible characteristics of the resin facings. It should be further noted that this conclusion is supported by the statements in Kaufmann `500 that care must be taken in bonding the resin facings to the core that the core does not become too warm as excess heat would degrade at least certain types of core.

The composite panel, as recited in claim 21, is thereby fundamentally and structurally distinguished from the panels taught by Kaufmann `500 because the composite panel of the present invention includes adhesive layers to bond the skins to the core while the panel taught by Kaufmann `500 does not include any such adhesive layers or any equivalents thereof.

It is, therefore, the Applicant's position that claim 21, and all of the claims dependent therefrom, are fully and patentably distinguished over and from the teachings of Kaufmann `500, under either or both of 35 U.S.C. § 102 and/or 35 U.S.C. § 103, for the above reasons. The Applicant, therefore, respectfully requests that the Examiner reconsider and withdraw all rejections of claim 21 and all claims dependent therefrom over Kaufmann `500, and allow claim 21 and 26 and all claims dependent therefrom as amended herein above.

Continuing to consider the fundamental distinctions between the present invention and Kaufmann `500, it must be noted that there are basic distinctions between at least certain of the materials used in the composite panel of the present invention and the composite panel taught by Kaufmann `500. For example, and as discussed above, according to Kaufmann `500 the core is constructed of folded aramid paper ribbons, specifically, Nomex^{tm}, wherein Nomex^{tm} is made from an aramid paper composed of aramid thermoplastic fibers. In contrast, the core of the present invention as recited in claims 16, 21 and 26 comprises individually extruded polyetherimid tubes, so that the core of the present invention not only comprises fundamentally differently shaped and arranged elements but comprises a basically different material.

In addition, it must be noted that according to the composite panel of the present invention, the skins comprise a reinforced thermoplastic laminate thermoformable in a temperature range of 150°C to 300°C that is bonded to the core by a separate adhesive layer. In contrast, the Kaufmann `500 facings comprise a thermoplastic resin because the facings must be bonded directly to the core without an intervening layer of adhesive.

Lastly, it must be noted that in the composite panel of the present invention, as recited in 21, the skins are bonded to the core by adhesive layers which comprise a polyester base thermoplastic adhesive having a fusion temperature less than 150°C. In this regard, it must noted that the Examiner cites Kaufmann `500 as teaching, such as at column 5, line 9, the use of a thermoplastic polyimide adhesive (e.g., Kapton). It must also be noted, however, that Kaufmann `500, in fact, teaches only the use of the Kapton material as a *release agent*, and not as an adhesive. It should also be noted in this regard that a release material is the direct opposite of an adhesive in that adhesives function to bond or attach elements together while release agents function to facilitate the release of one material from another. In complete and fundamental contrast from the composite panels of the present invention, therefore, the Kaufmann `500 panels do not have any form of adhesive layer because, as discussed above, the facings are bonded directly to the core.

It is, therefore, the Applicant's position that claims 16, 21 and 26 and thereby all of the dependent claims are still fully and patentably distinguished over and from the teachings of Kaufmann `500, under either or both of 35 U.S.C. § 102 and/or 35 U.S.C. § 103, for the above reasons. The Applicant therefore respectfully requests that the Examiner reconsider and withdraw all rejections of claims 16, 21 and 26 and all of the dependent claims over Kaufmann `500, and allow claims 16, 21 and 26 and the dependent claims as amended herein above.

Next considering the teachings of Turner et al. `668, this reference relates to a multi-layer honeycomb structure or panel comprising two layers of honeycomb core separated by and faced by skin or facing layers bonded to each other and to the cores by adhesive layers.

One of the honeycomb core comprises contiguous straight walled hexagonal cells formed from strips of aramid paper ribbon and, although Turner et al. `668 does not describe the construction of the hexagonal cell honeycomb core in detail, such cores are typically

constructed, as discussed with regard to Kaufmann' 500, by shaping continuous paper strips into straight segments separated and joined by suitably angled folds and where the mating straight wall segments of adjoining hexagons are usually glued to one another to hold the ribbons in the desired hexagonal shapes. The second honeycomb core comprises contiguous straight walled hexagonal cells but, in this case, formed of aluminum rather than paper strips. Other than the difference in materials, however, that is, thin aluminum strips rather than paper strips, the aluminum honeycomb core is constructed in the same manner as the paper honeycomb.

It is apparent, therefore, that despite having two honeycomb cores, the only honeycomb core in Turner et al. `668 that has any pertinence at all to the present invention or to Kaufmann et al. `500, for the purposes of combining the two references, is Turner et al. `668's paper honeycomb core. It is also apparent, in this regard, that the Turner et al. `668 paper honeycomb core is essentially identical to that taught by Kaufmann et al. `500 so that Turner et al. `668 has no more to teach or relevance with regard to the paper honeycomb cores than does Kaufmann et al. `500. It should also be noted in this regard, that Turner et al. `668 does not include any teaching regarding the compression or crushing of the honeycomb layer structure for any reason, such as increasing the bonding area between one or more of the cores and the skins or separation layers.

It is, therefore, apparent that the combination of Turner et al. `668 with Kaufmann et al. `500 has no more to teach or suggest than does Kaufmann et al. `500 alone. The present invention as recited in claims 16, 21 and 26, and the dependent claims therefrom, are thereby fully and patentably distinguished over and from Turner et al. `668 and and the combination of Turner et al. `668 in view of Kaufmann et al. `500, under 35 U.S.C. § 103, with regard to the structure and materials of the honeycomb core for the same reasons that the

present invention, as recited in the pending claims, is fully and patentably distinguished over and from Kaufmann et al. `500.

Further in this regard, it is apparent that the only teaching in Turner et al. `668 that is not present in Kaufmann et al. `500 and that would add new teachings to that of Kaufmann et al. `500 is that the Turner et al. `668 panel employs a layer of adhesive to secure the skins to the honeycomb cores, as does the panel of the present invention. It must be noted in this regard, however, that the materials used in the Turner et al. `668 skins and adhesive are significantly and fundamentally different from those taught in the present invention, and these differences result in significant fundamental differences in the structure and characteristics of the Turner et al. `668 panel with regard to the panel of the present invention.

That is, and more specifically, the present invention teaches and recites that the honeycomb panel comprises a polyetherimid thermoformable material, the skins comprise a thermoformable thermoplastic laminate, and the adhesive layers comprise a polyester base thermoplastic adhesive. The present invention also teaches and recites that the structures and materials of the present invention allows relative movement between the skins and the core when heated appropriately, thereby allowing a panel to be shaped or reshaped, for example, into a curved form.

In complete and fundamental contrast from both the panel of the present invention and the panel taught by Kaufmann et al. `500, Turner et al. `668 states that the skin or facing layers comprise an epoxy film and that the skins or facings are to be bonded to one another and to the cores by an epoxy adhesive. Not only are these material fundamentally different from those recited in the presently pending claims and those used in Kaufmann et al. `500, but the resulting structure cannot be heated and thermally formed after the epoxy materials cure. This distinction, from both the present invention and Kaufmann et al `500, is further emphasized when it is noted that Turner et al. `668 does not describe the panels as being reformable or

reshapable after the epoxy adhesives cure, and in fact describes the panels only as rigid panels.

It is, therefore, the Applicant's position that Turner et al. `668 does not in any way teach or suggest the present invention as recited in independent claims 16, 21 and 26, and the dependent claims therefrom, under the requirements and provisions of 35 U.S.C. § 103 for the reasons discussed above.

It is also the Applicant's position that not only are the teachings of Turner et al. `668, that could possibly be combined with the teachings of Kaufmann et al. `500, not add anything to the teachings of Kaufmann et al. `500, but that the remaining teachings of Turner et al. `668, in fact, teach away from and contrary to both Kaufmann et al. `500 and the present invention, as recited in the claims. It is therefore the Applicant's position that the present invention, as recited independent claims 16, 21 and 26 and the dependent claims therefrom, are fully and patentably distinguished over and from the teachings of Turner et al, `668 and Kaufmann et al. `500 taken individually and all permissible combinations of Turner et al. `668 and Kaufmann et al. `500 under the requirements and provisions of 35 U.S.C. § 103, for the reasons discussed above.

The Applicant, therefore, respectfully requests that the Examiner reconsider and withdraw all rejections of independent claims 16, 21 and 26 and the claims dependent therefrom over Turner et al, `668 and Kaufmann et al. `500 and all combinations of Turner et al. `668 and Kaufmann et al. `500 under 35 U.S.C. § 103, and allow all claims as amended herein above.

Next, considering the teachings contained in "Thermoplastic Polymer Products" and the conclusions drawn by the Examiner based upon "Thermoplastic Polymer Products", the Examiner particularly cites this reference for the physical properties stated therein of the material (PEKK) taught by Kaufmann et al. `500 for use in the skins of the Kaufmann et al. `500

panels and which the Examiner points out as being a thermoplastic material such as used in the panels of the present invention.

The Applicant respectfully disagrees with the Examiner's conclusions regarding the materials taught by Kaufmann et al. `500, and specifically the Examiner's conclusion that the PEKK taught by Kaufmann et al. `500 is a thermoplastic material such as taught in the present invention. In this regard, it must first be noted that the specification and claims of the present Application describe and recite the material used in the skins and honeycomb core of the present invention both in term of both the material's composition, that is and respectively, as a polyetherimid thermoformable material and a thermoformable thermoplastic laminate, and in terms of the fusion temperature ranges of each of the materials, thereby further limiting the range of possible materials that may be used for these elements of the inventive panel. In this regard, it must be noted that the fusion or thermoformable temperature ranges are significant in determining the structural properties of the claimed panels and, in particular, in constructing panels that allow relative movement between the skins and the core when heated appropriately, thereby allowing a panel to be shaped or reshaped, for example, into a curved form.

The Examiner is correct that Kaufmann et al. `500 specifies that the skins of the Kaufmann et al. `500 panels shall be made of PEKK thermoplastic. "Thermoplastic Polymer Products", however, which is cited by the Examiner is describing the properties of the Kaufmann et al. `500 PEKK thermoplastic skins, describes PEKK and thus the Kaufmann et al. `500 PEKK thermoplastic skins as having fusion or thermoforming temperatures in the range of 585°F to 585°F, which is equivalent to 307°C to 360°C.

It must first be noted that the Examiner has had to aggregate the specific melting temperatures of three different PEKK materials, that is, OXPEKK-SP, PXPEKK-C and OXPEKK-C-E with melting temperatures in the range of 585°F to 680°F to obtain the cited temperature range.

This is itself a graphic illustration that not all thermoplastics are alike, or even the same material, and differ notably in their physical properties, and clearly illustrates that the skin material recited in the present claims, that is, a reinforced thermoplastic laminate material having a fusion or thermoformable temperature of 150°C to 300°C, is a significantly different material than that taught by Kaufmann et al. `500.

In addition, the skin material taught by Kaufmann et al. `500 could not be used in the panels of the present invention because the melting or thermoformable temperature of PEKK materials are all significantly higher than the thermoformable temperature of the core material of the present invention as recited in the claims, so that the core of a panel of the present invention may well be destroyed when bonding the skins to the core.

It must also be noted that not only does Kaufmann et al. `500 not teach the skin or core materials recited in the presently pending claims, but Kaufmann et al. `500 does not teach or suggest the use of skin and core materials having the relative thermoformable temperature ranges of the present invention, as recited in the pending claims, for the purpose of allowing post-manufacture thermoform shaping of the panels.

Further in this regard, and because of the above discussed differences between the materials taught by Kaufmann et al. `500 and the present invention, Kaufmann et al. `500 does not even suggest the thermally controlled compression of a panel of the present invention in order to expand or spread the ends of the honeycomb tubes at the surface of the skins to increase the contact area between the tubes and the skins. Because of the differences in materials, Kaufmann et al. `500 instead teaches that the panels should be crushed until the walls of the hexagons bend or fold sufficiently so that portions of the sides of the walls contact the skins.

It is, therefore, the Applicant's position that "Thermoplastic Polymer Products" does not teach or suggest the present invention, as recited in independent claims 16, 21 and 26 and the

dependent claims therefrom, under the requirements and provisions of 35 U.S.C. § 103 for the reasons discussed above.

It is also the Applicant's position that even if the teachings of "Thermoplastic Polymer Products" were to be combined with the teachings of Turner et al. `668 and Kaufmann et al. `500, the result would not add anything to the teachings of Kaufmann et al. `500 and that the combination of "Thermoplastic Polymer Products" with Turner et al. `668 and Kaufmann et al. `500 does not teach or suggest the present invention as recited in the claims as amended herein above.

It is, therefore, the Applicant's position that the present invention as recited independent claims 16, 21 and 26 and the dependent claims therefrom are fully and patentably distinguished over and from the teachings of Turner et al, `668 and Kaufmann et al. `500 and "Thermoplastic Polymer Products" taken individually and all combinations of "Thermoplastic Polymer Products," Turner et al. `668 and/or Kaufmann et al. `500 under the requirements and provisions of 35 U.S.C. § 103, for the reasons discussed above. The Applicant, therefore, respectfully requests that the Examiner reconsider and withdraw all rejections of independent claims 16, 21 and 26, and the claims dependent therefrom, over Kaufmann et al. `500, Turner et al, `668 and "Thermoplastic Polymer Products" taken individually and all permissible combinations thereof under 35 U.S.C. § 103, and allow all claims as amended herein above.

Finally with regard to Heitkamp `217, which was cited because of it's teaching of a "polyetherimide extruded tubular cell base core" (column 5, lines 38-39) the Applicant contends that the current amendments overcome this reference when combined with any of the other references as Heitkamp `217 does not include a teaching that only the end regions of the tubes are deformed while the walls of the tubes remain parallel.

Next considering further issues raised verbally by the Examiner in conversions with the representatives of the Applicant during the period of approximately November 1, 2006 and November 6, 2006, these conversations may be summarized in that the Examiner raised questions of whether the present invention as recited in the presently amended claims could be distinguished under 35 U.S.C. § 103 over the combination of Heitkamp '217 with Kaufmann '500 and, in particular, the combination of Heitkamp '217 and Kaufmann '500 with U.S. Patent No. 5,238,725 to Effing et al. for a METHOD FOR FORMING A STRUCTURAL PANEL WITH DECORATIVE FACING AND PRODUCT THEREOF, hereafter referred to as Effing '725. In this regard, it should be noted that the Effing '725 reference was newly raised by the Examiner during conversations with the Applicant's representatives and had not been previously considered.

In response to these new issues raised by the Examiner, the Applicant and the undersigned would like to thank the Examiner for the courtesy and consideration expressed by the Examiner in discussing the present Response with the Applicant's representatives in a sincere effort to advance prosecution and allowance of the present Application.

Considering the Kaufmann '500, Heitkamp '217 and Effing '725 references in light of the discussions, it is the Applicant's position that the present invention as recited in the claims as presented herein above remains patentably distinguished over the Kaufmann '500 and Heitkamp '217 references and all combinations thereof for the reasons discussed herein above.

Considering each of the references in turn in light of the Examiner's comments during the discussions, and in light of the new Effing '725 reference, and first again considering Kaufmann '500, the core in Kaufmann '500 is formed of a honeycomb of hexagonal cells formed by strips of aramid paper folded and fixed to adjacent strips of folded aramid paper with facings applied to both sides of the core under heat and pressure. As described in Kaufmann '500, such as at column 3, lines 57-66, the heat and pressure applied to the core

during the assembly of the facings to the core are sufficient to cause the walls of the hexagonal cells to be folded and crushed into hook-like configurations, all of which point generally in a direction opposite to the movement of the core through the heating and pressing apparatus.

It is, therefore, apparent that there are a number of fundamental distinctions between the present invention and the honeycomb cores as taught by Kaufmann '500. For example, in the present invention the honeycomb core is formed of "a plurality of individually extruded tubes arranged adjacently and in parallel and in a hexagonal pattern to form a honeycomb wherein each tube has a first end in contact with a first side skin and a second end in contact with a second side skin". The Examiner will appreciate that this structure is fundamentally different from the core taught by Kaufmann '500, which is comprised of a honeycomb core constructed of hexagonal cells formed by strips of aramid paper folded and fixed to adjacent strips of folded aramid paper, and that the core of the present invention as claimed will have very different structural characteristics than the core taught by Kaufmann '500. For example, each of the tubular members of the honeycomb of the present invention is mechanically independent from the adjacent tubular members, rather than sharing common honeycomb cell walls, and is has walls of tubular shape, rather than of flat panels, so that the behavior of the core elements in the present invention under heat and pressure will be very different from the behavior of the straight walled honeycomb cells of the Kaufmann '500 core.

In addition, and as a consequence of the above fundamental differences in the shapes and construction of the honeycomb members of the Kaufmann '500 core and the core of the present invention, the heat and pressure applied to the Kaufmann '500 core causes the walls of the hexagonal cells to be folded and crushed into hook-like configurations, all of which point generally in a direction opposite to the movement of the core through the heating and pressing apparatus, thereby resulting in a non-symmetric structure such as is clearly shown in Fig. 3 of kaufmann '500.

It must also be noted that while Kaufmann '500 describes the crushing and bending of the walls of the hexagonal cell members as increasing the contact area between the walls of the cells and the facings, it is very clear from FIG. 3 that the hexagonal cell walls are not crushed or bent by an amount sufficiently to bridge the distances between adjacent cell walls. It is also noted that Kaufmann '500 describes the bending and crushing of the hexagonal cell walls only as increasing the contact area between the walls and the facings, and not as bridging the spaces between cell walls.

In complete contrast from Kaufmann '500, the shape and construction of the tubular honeycomb cells of the core of the present invention is such that the application of heat and pressure causes only the very ends of the tubular elements to be deformed while the walls along a center region of the cells remains unaffected by the heat and pressure and thus remain straight and parallel to one another. The honeycomb core members of the present invention do not form non-symmetric "hook-like" shapes, but instead remain symmetric in form, which provides a significantly stronger final structure.

It must also be noted that as described in the present Application the deformation of the end regions of the tubular elements of the honeycomb core of the present invention deform symmetrically. That is, the diameters of the tubes in the end regions of the tubes increase under heat and pressure until the end regions of each tube expand symmetrically by an amount sufficient to bridge the space between the end regions of the tube and the expanded end regions of the adjacent tubes. Unlike the hexagonal core elements of kaufmann '500, which deform into non-symmetric hook-like structures, the core elements of the present invention deform into symmetric structures that are, as a consequence, significantly stronger than those of kaufmann '500.

In addition, it must be noted that the symmetric deformation under heat and pressure of the end regions of the tubular members of the honeycomb core of the present invention is

specifically great enough that the end region of each tubular member expands sufficiently to bridge the space between the tubular member and the adjacent tubular members. This result not only increases the contact area between the core members but, in complete contrast from Kaufmann '500, increases the thickness of the facing/core element end region of the core over the entire area between the end regions of the tubular elements, thereby significantly increasing the strength of the core.

It is, therefore, apparent that the structure of the core of the present invention is completely and fundamentally different in every aspect from that of the Kaufmann '500 core, so that kaufmann '500 is not relevant to and does not teach or suggest the core of the present invention or the method by which the core of the present invention is formed.

Lastly with respect to Kaufmann '500, it is noted that Kaufmann '500 describes a foam core at, for example, column 4, lines 7-20. The Examiner will be well aware, however, that a foam core is structurally very different than a honeycomb core so that this teachings by kaufmann '500 is not pertinent or relevant to the present invention as claimed.

Next considering Heitkamp '217, Heitkamp '217, like Kaufmann '500, teaches a core comprised of flat walled hexagonal cells and thus, like Kaufmann '500, differs from the present invention in all aspects pertinent to the fundamental structural shapes of the core elements.

In fundamental distinction from both the present invention and Kaufmann '500, however, Heitkamp '217 is directed to a process for forming a fire resistant honeycomb panel by impregnating or coating the honeycomb core with a fire resistant substance, specifically sodium silicate, before applying the facing sheets to the core structure and the Heitkamp '217 process does not in any way apply heat or pressure or a combination of heat and pressure to the core or to the facing sheets bonded thereto for the purpose or intent of deforming or otherwise mechanically modifying the hexagonal core cell structures.

Heitkamp '217 instead applies heat to the core during the core fabrication process, but only after dipping the core into the sodium silicate and only for the purpose of drying the sodium silicate, primarily to prepare previous coatings of sodium silicate for a further dipping and coating. This point, and distinction from both the present invention and Kaufmann '500, is clearly illustrated in that the heat applied to the core during the fabrication of the core is in the range of 65°C to 135°C, which according to the present invention is too low to adequately soften the core material to allow the deformation and desired shaping of the core structure.

The Applicant notes that Heitkamp '217 describes heating the assembled core and facings to the temperature range of 135°C to 200°C, but this heating step occurs only after fabrication of the panel is completed and not for purposes of molding or forming the core or any part of the panel, but only for purposes of curing the materials comprising the panel.

It is, therefore, apparent that the panel and method of fabrication of the panel of the present invention are fully and fundamentally distinguished from Heitkamp '217 by the structure of the respective cores, the processes for fabricating the respective cores, and the structures and characteristics of cores and panels resulting from the two processes. For example, the present invention teaches and claims heating the core materials to a moldable temperature and applying pressure to the core and facings to deform the core structures in a specific manner, while Heitkamp '217 does not heat the core structures to a moldable temperature and does at any time apply pressure to the core to deform the core structures in any manner.

It is also apparent that Heitkamp '217 cannot be and should not be combined with the teachings of Kaufmann '500 for the same reasons that the present invention is distinguished over and from Heitkamp '217. That is, the panel and method of fabrication of the panel of Kaufmann '500 are fully and fundamentally distinguished from Heitkamp '217 by the structure of the respective cores, the processes for fabricating the respective cores, and the structures

and characteristics of cores and panels resulting from the two processes. For example, Kaufmann '500 teaches heating the core materials to a moldable temperature and applying pressure to the core and facings to deform the core structures in a specific manner, while Heitkamp '217 does not heat the core structures to a moldable temperature and does at any time apply pressure to the core to deform the core structures in any manner. In fact, the heating and pressure application steps taught by Kaufmann '500 would probably destroy or damage the coating or impregnation of the core with sodium silicate, which is the entire object of the Heitkamp '217 process.

It is therefore apparent that the Kaufmann '500 and Heitkamp '217 references cannot be and should not be combined in any way, much less to form a teaching having any relevance to the present invention.

Lastly, Effing '725 teaches a honeycomb core comprised of hexagonal cells formed from strips of aramid paper folded and and fixed to adjacent strips of aramid paper, such as described at column 2, lines, 3-7, and covered by facing comprised of PEKK/glass, which is also known as KEVLAR. As discussed above, a core made in this manner has very different structural properties than the core of the present application and the present invention is fundamentally distinguished from Effing '725 for this reason.

The present invention is also fundamentally distinguished from Effing '725 by the processing temperature range of 250-350°C, which much higher than the processing temperature ranges of the present invention and which is required because the Effing '725 facings are made of PEKK/glass, which is a fundamentally and significantly different material from the materials of the present invention. Effing '725 in fact notes this temperature range problem with respect to the aramid paper core by stating that the step in which the PEKK/glass facing are bonded to the aramid core must be performed very rapidly to avoid destroying the aramid paper core. The present invention is thereby fundamentally distinguished from

Effing '725 because the present invention recites heating the core structure to a moldable temperature, while Effing '725 teaches that the core should not be heated to a moldable temperature range while at the same time teaching that the facing skins should be heated to a range far beyond the moldable temperature range of the core structure, but for so brief a period as to not heat the core structure.

It must also be noted that, in fundamental contrast from the present invention, Effing '725 does not teach or suggest the application of pressure to the core when heating to a moldable temperature range for the purpose of deforming the core structure for any reason.

It is, therefore, clear that the present invention as claims is fully and fundamentally distinguished over and from Effing '725 for these reasons.

It is also apparent that Effing '725 and Kaufmann '500 are fundamentally incompatible for the very same reasons. That is, Kaufmann '500 teaches heating the core structure to a moldable temperature, while Effing '725 teaches that the core should not be heated to a moldable temperature range while at the same time teaching that the facing skins should be heated to a range far beyond the moldable temperature range of the core structure, but for so brief a period as to not heat the core structure.

In addition, and again, Effing' 725 does not teach or suggest the application of pressure to the core when heating to a moldable temperature range for the purpose of deforming the core structure for any reason, while Kaufmann '500 teaches heating the core to a moldable temperature and applying pressure to deform the core structure.

It is, therefore, apparent that the Kaufmann '500 and Effing '725 references cannot be and should not be combined in any way, much less to form a teaching having any relevance to the present invention.

Lastly, it will be noted that we have proposed certain amendments to the claims to further emphasize these distinctions between the present invention and the cited prior art references.

It is, therefore, the Applicant's position that the present invention as recited in the claims as presented herein above is fully and patentably distinguished over and from Kaufmann '500, Heitkamp '217 and Effing '725 and all combinations thereof under the requirements and provisions of 35 U.S.C. § 103. The Applicant therefore respectfully requests that the Examiner reconsider and withdraw all rejections of the claims as presented herein above over the cited prior art and under the requirements and provisions of 35 U.S.C. § 103, and the allowance of the present Application with the claims as presented herein above.

Lastly, it will be noted that we have proposed certain amendments to the claims to further emphasize these distinctions between the present invention and the cited prior art references.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejection(s) should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Kaufmann et al. `500, Turner et al. `668, "Thermoplastic Polymer Products", Heitkamp '217 and/or Effing '275 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field,

the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,

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